



A.D. 1867, 24th OCTOBER. N^o 2987.

S P E C I F I C A T I O N

OF

JOHN ELLISON AND JOSEPH STIRK.

ECONOMIZING FUEL AND CONSUMING
SMOKE IN BOILERS AND FURNACES.

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A.D. 1867, 24th OCTOBER. N° 2987.

**Economizing Fuel and Consuming Smoke in Boilers
and Furnaces.**

LETTERS PATENT to John Ellison and Joseph Stirk, both of Leeds, in the County of York, Engineers, for the Invention of “**IMPROVED MEANS AND APPARATUS FOR ECONOMIZING FUEL AND CONSUMING SMOKE IN STEAM BOILERS AND FURNACES.**”

Sealed the 21st April 1868, and dated the 24th October 1867.

(Void by reason of the Patentees having neglected to file a Specification in pursuance of the conditions of the Letters Patent.)

PROVISIONAL SPECIFICATION left by the said John Ellison and Joseph Stirk at the Office of the Commissioners of Patents, with their Petition, on the 24th October 1867.

We, JOHN ELLISON and JOSEPH STIRK, both of Leeds, in the County of
5 York, Engineers, do hereby declare the nature of the said Invention for
“**IMPROVED MEANS AND APPARATUS FOR ECONOMIZING FUEL AND CONSUMING
SMOKE IN STEAM BOILERS AND FURNACES,**” to be as follows :—

Our Invention has reference principally to Cornish boilers, though applicable
to other boilers and also furnaces. Taking an old Cornish boiler, for example,
10 which is fired internally within the flue and behind the bridge, we insert an
archimedean screw composed of metal, cast or wrought, or of any other suitable
substance. This screw may be of nearly the same diameter as the flue itself,

Ellison & Stirk's Improved Means of Economizing Fuel and Consuming Smoke, &c.

& may extend from the bridge to the end of the flue. The action resulting from the use of it is that the flames from the fire after passing the bridge are conveyed equally over the whole internal surface of the flue, by which means the water under the flue in the lower part of the boiler becomes heated (instead of being nearly cold as is the case in ordinary flues), as well as that surrounding the top and sides. A further result arising from the use of this screw (the vanes of which are supposed to be solid as well as its centre or core) is that its vanes becoming heated from the action of the flames the smoke which would otherwise be emitted into the chimney is consumed, consequently we attain the two points of economizing fuel and consuming smoke. Modifications of this arrangement which we are about to name give the same results. In the example above noted the axis of the screw was assumed to be solid, in some instances, however, we prefer to make it hollow, and we use such hollow tube either as an air passage from the bridge to the extreme end, or we make it a water passage communicating at the bridge end with the lower part of the flue and at the other end with the steam chamber of the boiler. Also the vanes of the screw we sometimes prefer to make hollow and of metal, in that case they communicate with the water space of the boiler, and give additional heating surface for generating steam.

In a new boiler we propose to make the flue itself from the bridge point to the extreme end of a similar screw formation, thereby gaining the advantages of increased heating surface and greater or less combustion of smoke. We may here add that we speak of this arrangement for new boilers simply because in practice it can hardly be supposed the owners of boilers will care to take out their old flues, inasmuch as by the first-named arrangement the same results can be attained. In some instances we cause the screw within the flue to rotate slowly by means of ordinary mechanical appliances, with the object of acting as a self-acting flue cleaner.

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Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1868.